

HD6D LIDAR for High Speed Descent Mapping, Phase I

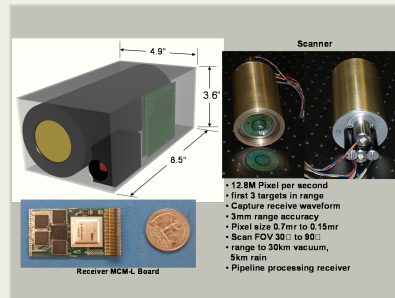
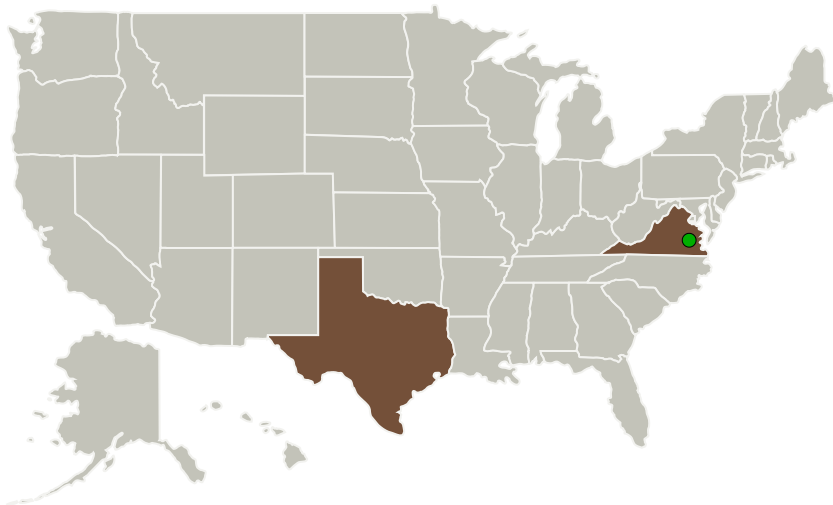
Completed Technology Project (2014 - 2014)



Project Introduction

Systems & Processes Engineering Corporation (SPEC) and Texas A&M University (TAMU) propose a space hardened, compact, low power, high definition six-dimension (HD6D) LADAR for remote sensing. This modular situation awareness HD6D LADAR can be configured by platform and mission to support operational ranges from 8km to 30 km, while meeting CubeSat form factors of .5U to 3U, respectively. The .5U CubeSat configuration has a 3.2Mpps HD6D Micro-LIDAR with integrated high resolution, 5 Mpixel, 30fps, RGB camera and can achieve a 4km effective range in single pulse mode or 8km range in integrated image mode (for 0.1 reflectivity targets). The long range Gen IV HD6D configuration can be used for descent imaging. It has a 12.8Gig pixels per second acquisition rate, 100x faster than competitors, and a clear air range of 20km. Current Gen IV LIDARs have a 30 degree field of view, using pixel sizes of 0.7mr or 0.15mr. Built around the space qualified Vertex-5QV FPGA, using pipeline processing to calculate the stabilized x,y,z amplitude point cloud, merges the point cloud with the RGB image, and produces HD6D binned images (x,y,z,R,G,B). The LIDARs have range accuracy of 3mm at close range, 35mm at acquisition ranges.

Primary U.S. Work Locations and Key Partners



HD6D LIDAR for High Speed Descent Mapping Project Image

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| Organizations Performing Work | Role | Type | Location |
|---|-------------------------|--|-------------------|
| Systems & Processes Engineering Corporation | Lead Organization | Industry Veteran-Owned Small Business (VOSB) | Austin, Texas |
| ● Langley Research Center(LaRC) | Supporting Organization | NASA Center | Hampton, Virginia |

Primary U.S. Work Locations

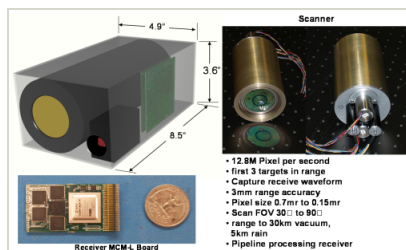
| | |
|-------|----------|
| Texas | Virginia |
|-------|----------|

Project Transitions

**June 2014:** Project Start**December 2014:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/137578>)

Images

**Project Image**

HD6D LIDAR for High Speed Descent Mapping Project Image
(<https://techport.nasa.gov/image/132791>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Systems & Processes Engineering Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

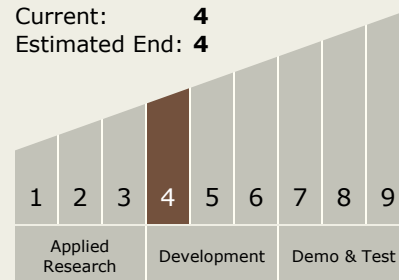
Brad Sallee

Technology Maturity (TRL)

Start: 4

Current: 4

Estimated End: 4



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System